

WHAT IS CLAIMED IS:

1           1.    A method for specifically delivering an  
2   effector molecule to a tumor cell bearing a polypeptide  
3   antigen of at least 10 contiguous amino acids from the  
4   polypeptide sequence of SEQ. I.D. NO. 2, wherein said  
5   polypeptide binds to antisera raised against the full-length  
6   polypeptide of SEQ. I.D. NO. 2 as an immunogen, which has been  
7   fully immunosorbed with a 40 kD polypeptide (the K1 antigen)  
  attached to the cell surface of OVCAR-3 and HeLa cells  
  ("mesothelin)", said method comprising:

          providing a chimeric molecule comprising said  
  effector molecule attached to a targeting molecule that  
  specifically binds to mesothelin; and

          contacting said tumor with said chimeric molecule;  
  wherein said chimeric molecule specifically binds to a tumor  
  cell.

1           2.    The method of claim 1, wherein said targeting  
2   molecule is an antibody to mesothelin.

1           3.    The method of claim 1, wherein said tumor is an  
2   ovarian tumor cell.

1           4.    The method of claim 1, wherein said effector  
2   molecule is selected from the group consisting of a cytotoxin,  
3   a label, a radionuclide, a drug, a liposome, a ligand, and an  
4   antibody.

1           5.    The method of claim 1, wherein said effector  
2   molecule is a *Pseudomonas* exotoxin.

1           6.    A method for impairing growth of tumor cells  
2   bearing a polypeptide antigen of at least 10 contiguous amino  
3   acids from the polypeptide sequence of SEQ. I.D. NO. 2,  
4   wherein said polypeptide binds to antisera raised against the  
5   full-length polypeptide of SEQ. I.D. NO. 2 as an immunogen,  
6   which has been fully immunosorbed with a 40 kD polypeptide

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(the K1 antigen) attached to the cell surface of OVCAR-3 and HeLa cells ("mesothelin"), said method comprising contacting said tumor with a chimeric molecule comprising:

a targeting molecule that specifically binds mesothelin; and

an effector molecule selected from the group consisting of a cytotoxin, a radionuclide, a ligand and an antibody; wherein said chimeric molecule specifically binds to a tumor cell.

7. The method of claim 6, wherein said cytotoxin is selected from the group consisting of *Pseudomonas* exotoxin, ricin, abrin and *Diphtheria* toxin.

8. The method of claim 6, wherein said tumor cell growth is tumor cell growth in a human.

9. The method of claim 6, wherein said contacting comprises administering said chimeric molecule to the human intravenously, into a body cavity, or into a lumen or an organ.

10. A method for detecting the presence or absence of a tumor bearing a polypeptide of at least 10 contiguous amino acids from the polypeptide sequence of SEQ. I.D. NO. 2, wherein said polypeptide binds to antisera raised against the full-length polypeptide of SEQ. I.D. NO. 2 as an immunogen, which has been fully immunosorbed with a 40 kD polypeptide (the K1 antigen) attached to the cell surface of OVCAR-3 and HeLa cells ("mesothelin"), said method comprising contacting said tumor with a chimeric molecule comprising:

a targeting molecule that specifically binds mesothelin; and a detectable label; and detecting the presence or absence of said label.

11. A pharmacological composition comprising a pharmaceutically acceptable carrier and a targeting molecule that specifically binds to a polypeptide of at least 10

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contiguous amino acids from the polypeptide sequence of SEQ. I.D. NO. 2, wherein said polypeptide binds to antisera raised against the full-length polypeptide of SEQ. I.D. NO. 2 as an immunogen, which has been fully immunosorbed with a 40 kD polypeptide attached to the cell surface of OVCAR-3 and HeLa cells (the K1 antigen) in a therapeutically effective dose.

12. The pharmacological composition of claim 11, wherein the targeting molecule is further joined to an effector molecule to form a chimeric molecule.

13. The composition of claim 12, wherein said effector molecule is selected from the group consisting of a cytotoxin, a label, a radionuclide, a drug, a liposome, a ligand, and an antibody.

14. The composition of claim 12, wherein the chimeric molecule is a single-chain fusion protein.

15. A kit for the detection of mesothelin comprising a container having a nucleic acid or an antibody specific for a polypeptide of at least 10 contiguous amino acids from the polypeptide sequence of SEQ. I.D. NO. 2, wherein said polypeptide binds to antisera raised against the full-length polypeptide of SEQ. I.D. NO. 2 as an immunogen, which has been fully immunosorbed with a 40 kD polypeptide (the K1 antigen) attached to the cell surface of OVCAR-3 and HeLa cells ("mesothelin") and instructional material for the detection of tumor cells bearing mesothelin.

16. A method for the inhibition of mesothelin expression or activity comprising contacting mesothelin bearing cells with inhibitory nucleic acids specific for the nucleic acid sequence set out in SEQ. I.D. NO. 1.

17. A vaccine for the inhibition or prevention of mesotheliomas or ovarian tumors comprising administering a mesothelin derived antigen to a patient.

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1           18. A method to screen drugs for treatment of tumor  
2 cells bearing mesothelin comprising subjecting a mammal  
3 containing transplanted tumor cells transfected with a nucleic  
4 acid sequence substantially identical to a sequence of SEQ ID  
5 No. 1 to a drug of interest, and monitoring tumor cell  
6 activity.

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